

REMARKS

The Office action mailed on 26 November 2003 (Paper No. 1103) has been carefully considered.

Claims 1, 3 through 6, 11, 13 through 15, 23, 25 through 28, and 32 through 35 are being canceled without prejudice or disclaimer, claims 7, 12, 17, 20, 22 and 29 are being amended, and claims 48 through 78 are being newly added. Thus, claims 7, 10, 12, 16, 17, 20 through 22, 29 and 36 through 78 are pending in the application.

In paragraphs 2-6 of the Office action, the Examiner imposed a restriction and withdrew previously newly added claims 35 through 47 (the Examiner's attention is invited to the dependency of claims 36 through 47 upon newly presented claim 78) from consideration as allegedly directed to a non-elected invention.

First, Applicant respectfully traverses the restriction requirement imposed by the Examiner in paragraphs 2-6 of the Office action on the grounds that the restriction requirement is being imposed merely for the administrative convenience of the U.S. Patent & Trademark Office. It should be noted that, previously, the Commissioner of Patents and Trademarks stated that mere administrative convenience is not a proper basis for imposition of a restriction requirement. On the latter basis, it is respectfully requested that the restriction requirement imposed in the previous Office action be withdrawn, and that claims 36 through 47 and 75 be examined in this application.

Second, claims 36 through 47 and 78 contain common subject matter; consequently the mandatory field of device and manufacture search are co-extensive. There is, therefore, no basis under 37 CFR §1.141 to justify maintaining the restriction. Its withdrawal, and examination of claim 75, are requested.

Third, the elected claims define a structure; under the first paragraph of 35 U.S.C. §112, each patent reference within the field of mandatory search for the elected claims must describe how to “make and use” the structure disclosed. Consequently, the mandatory field of search for the structure defined by the elected claims is necessarily concurrent with the field of search of claim 75. Withdrawal of the restriction and examination of claim 75, together with its dependent claims, is requested.

In paragraph 8 of the Office action, the Examiner rejected claims 10 through 15, 23 and 25 thru 27 under 35 U.S.C. §102 as alleged anticipated by Uemura, U.S. Patent No. 6,239,547. In paragraph 23 of the Office action, the Examiner rejected claim 16 under 35 U.S.C. §102 as alleged anticipated by Koizumi, U.S. Patent No. 5,216,320. In paragraph 26 of the Office action, the Examiner rejected claims 20 thru 22 and 32 through 34 under 35 U.S.C. §103 as alleged unpatentable over the Examiner’s proposed combination of Uemura '547 and Ando, U.S. Patent No. 4,349,766. For the reasons stated below, it is submitted that the invention recited in the claims, is patentably distinguishable from the prior art cited by the Examiner, and the Examiner’s proposed combination of that art, so as to preclude rejection under either 35 U.S.C. §102 or §103.

In paragraph 32 of the Office action, claims 7, 17 and 29 were objected as dependent upon a rejected base claim, but it was stated that these claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With respect to the indication of allowable subject matter in paragraph 32 of the Office action, it should be noted that previous dependent claims 7 and 29 are being amended to appear in independent form including all of the limitations of the base claim and any intervening claims. Therefore, immediate allowance of independent claims 7 and 29 should now be forthcoming.

In paragraph 9 of the Office action, the Examiner alleged that Figure 9B of Uemura '547 disclosed a cathode for an electron tube having “a metal base (905) and an electron-emitting material (903) coated on the metal base” (quoting from paragraph 9, lines 2-3 of the Office action). A review of Uemura '547 however, reveals that element 905 is not a “metal base” as claimed, but rather is a conductive adhesive (*see* column 17, lines 10-14 of Uemura '547). On this basis alone, a rejection under 35 U.S.C. §102 for direct anticipation is not appropriate.

In addition, in paragraph 9 of the Office action, the Examiner alleged that, in Uemura '547, the “needle-shaped conductive material” is “selected from a group consisting

essentially of carbon, indium tin oxide, nickel, magnesium, rhenium, molybdenum, and platinum” (quoting from paragraph 9, lines 4-6 of the Office action). In support of the latter statement, the Examiner cited column 2, lines 48-53 of the patent, but a review of that portion of the text of the patent reveals the disclosure of only carbon and a graphite column as materials for the electron-emitting source. Thus, there is no disclosure or suggestion in Uemura '547 of the provision of a conductive material which is selected from a group consisting of indium tin oxide, nickel, magnesium, rhenium, molybdenum, and platinum.

With independent claim 10, in paragraph 13 of the Office action, the Examiner alleged that Uemura '547 discloses “a surface roughness corresponding to a distance between the highest point and the lowest point on the surface of the electron-emitting layer being less than 10 microns” (quoting from paragraph 13, lines 3-5 of the Office action). The Examiner cited column 16, lines 29-39 of Uemura '547 in support of the latter proposition, but that portion of the cited patent merely contains a general description of the formation of the bundle 902 of graphite fibers 901 appearing in Figure 9A of the patent. More importantly, in column 16, lines 29-39 of Uemura '547, and in fact in the patent as a whole, there is no disclosure or suggestion of a surface roughness corresponding to a distance between the highest point and the lowest point on the surface of the electron-emitting material layer “being less than 10 microns” as recited in independent claim 10. That is to say, not only does Uemura '547 not specifically disclose the recited distance as “being less than 10 microns”, but more importantly Uemura '547 does not at all discuss any numerical value for the

distance between the highest point and the lowest point on the surface of the electron-emitting layer. Thus, not only is the rejection under 35 U.S.C. §102 for direct anticipation inappropriate, but also a rejection under 35 U.S.C. §103 for alleged obviousness is equally inappropriate. For these reasons, it is submitted that independent claim 10 recites the invention in a manner distinguishable from the prior art so as to preclude rejection under 35 U.S.C. §102 or §103, and immediate allowance of independent claim 10 and its associated dependent claims should be forthcoming.

Dependent claim 12 (which is dependent from claim 10) provides a further basis for distinguishing the invention from the prior art, especially since dependent claim 12 is being amended to delete the element carbon from the list of elements forming the group from which the needle-shaped conductive material is selected. Thus, dependent claim 12 is allowable based on the reasons set forth above for allowability of independent claim 10.

Dependent claim 20 is being amended to depend from independent claim 10 rather than from dependent claim 11. Dependent claim 20 recites the cathode as further comprising a metal layer including nickel grains having sizes smaller than sizes of grains in the metal base, the metal layer being formed between the metal base and the electron-emitting material layer. It is respectfully submitted that, by virtue of the latter recitation, dependent claim 20 provides a further basis for patentability of the invention.

In the latter regard, in paragraph 27 of the Office action, in connection with the rejection of claim 20 and other claims under 35 U.S.C. §103 based on the combination of Uemura '547 with Ando '766, the Examiner admitted that Uemura '547 does not disclose a metal layer including nickel grains having sizes smaller than sizes of grains in the metal base, the metal layer being formed between the metal base and the electron-emitting material layer, as recited in dependent claim 20. In paragraph 30 of the Office action however, the Examiner inadvertently asserted that Figure 1 of Ando '766 “teaches that it is known in the art to provide cathodes for an electron tube with a metal layer (2) including nickel grains having sizes smaller than the grains in the metal base layer (5)” (quoting from paragraph 30, lines 2-3 of the Office action). Figure 1 of Ando '766 is singularly devoid of any description of the sizes of the nickel grains relative to the grains in the metal base layer; rather Ando '766 merely contains a general diagram of a base metal 1 on which nickel power 2 is disposed and on which a thermal electron emission oxide layer 3 is formed. Neither Figure 1 nor any text of Ando '766 discusses or suggests the relative size between the nickel grains and the grains in the metal base layer. Therefore, it cannot be said that the prior art discloses or suggest the recitation contained in dependent claim 20 relating to the nickel grains having sizes smaller than sizes of grains in the metal base. Thus, dependent claim 20 recites patentable subject matter for the reasons stated above relative to independent claim 10 in combination with the reasons just stated relative to dependent claim 20 itself.

Dependent claim 21 recites, *inter alia*, tungsten among the elements forming a group

from which the metal layer recited in dependent claim 20 is formed. In paragraph 28 of the Office action, the Examiner admitted that Uemura '547 fails to disclose a metal layer formed from at least one metal selected from the group recited in dependent claim 21. In paragraph 30 of the Office action however, the Examiner inadvertently alleged that Ando '766 “discloses the metal layer further includes tungsten” (quoting from paragraph 30, lines 4-5 of the Office action). The Examiner cited column 3, lines 27 of Ando '766 in support of this proposition, but a thorough reading of that portion (as well as the Ando '766 patent in its entirety) reveals only the disclosure of tungsten as an element from which the metal layer can be formed as a component of an alloy of a base material, rather than as the constituent metal of the layer formed between Applicant's metal base and electron-emitting material layer defined by claim 21. Consequently, the proposed combination of Uemura '547 and Ando '766 fails to negate the patentability of claim 21.

Dependent claim 22 provides a further basis for patentability of the invention by virtue of its recitation of the cathode as comprising a metal layer formed between the metal base and the electron-emitting material layer with “a thickness of said metal layer being in a range of 1 to 30 μm ” (quoting from claim 22). By virtue of the latter recitation, dependent claim 22 provides a further basis for patentability of the invention based on the same arguments set forth above relative to independent claim 4.

Claims 48 through 78 are newly presented in order to assist the Examiner in rapidly


concluding, and thereby expediting this compacted prosecution, by providing alternative definitions of the disclosed invention. Specifically, independent claims 48, 51, 57, 63, 68, 72 and 78 drawn collectively from paragraphs 35, 32, 35, 57, 59 and 85 of Applicant's specification, provide the definition of novelty not found in either Koizumi '320 or Uemura '547. The Examiner's attention is invited to the fact that Uemura '547 relies upon an electron emitter formed from a “deposited column [that] is made up of two parts, i.e. an outer hard husk and black inner fragile core” (*see* column 5, lines 1 and 2) with “the electron-emitting source of ... made of carbon nano tubes formed from a columnar graphite layer” (*see* column 21, lines 9-12). Moreover, Koizumi '320 uses barium scandate particles contained in an alkaline earth metal oxide layer, with the “carbonate used to form the alkaline earth metal oxide particles” having a “needle light shape” so that the “oxide formed from this material also inherents this shape.” In contradistinction, Applicant's newly presented claims define the structure with a different electron-emitting material neither taught nor suggested, by Koizumi '320

In particular, it should be noted that dependent claims 56, 61 and 67 recite a “thickness of said electron-emitting material layer being in a range of 30 to 80 μm ” (quoting from the claims). While dependent claims 55, 59, 66 and 76 define a particularly desirable surface characteristic and thereby provide a further basis for patentability.

In view of the above, it is submitted that the claims of this application are in condition for allowance, and early issuance thereof is solicited. Should any questions remain unresolved, the Examiner is requested to telephone Applicant's attorney.

A fee of \$320.00 is incurred by the addition of thirteen (13) total claims in excess of total 39 and one (1) independent claim in excess of total 8. Applicant's check drawn to the order of Commissioner accompanies this Amendment. Should the check become lost, be deficient in payment, or should other fees be incurred, the Commissioner is authorized to charge Deposit Account No. 02-4943 of Applicant's undersigned attorney in the amount of such fees.

Respectfully submitted,



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